Notebook Series -- Notebooks by Edison
Notebook, N-18-09-05

This notebook was used by Edison in September 1918 to investigate chemical salts and solutions for use in Lalande primary batteries. Included are notes on the preparation of various compounds, reminders to check for the solubility of zinc hydroxide, and ideas for the construction of cells and electrodes. One note suggests using discarded electroplated record molds. Some notes indicate experiments to try in the future. The front cover is labeled "Lelande Experiments" and "Sept 5 1918." The pages are unnumbered. Only 18 pages have been used.

Mono Arsenite of Lead.
$PbO\ AsO_3 + x\,aq$ insol in KOH
but sol in NaOH.

Arsenite Manganese ppt.

Antimoniate of Cobalt 5 Sol H_2O
CoO, SbO_5 after ignition insol
in alkali.

ditto Copper
$CuO, SbO_5 + x\,aq$ after
ignition not sol acids or alkalis

Insoluble Antimoniate of Potash
$KO, 2\,SbO_5 + 6\,aq$
insol H_2O, sol in boiling
Conc KOH. but deposited
again on cooling. traces
left can be precipitated by
adding a Sol K Salt,

1 pt of Soda Salt in 350 pts of water is precipitated by Antimoniate of Potash

Antimonate Soda
$NaO.SbO_5 + aq^n$ 7 aq
almost insoluble in water
Sol in alkaline solution

Kermes Mineral -
$KaSbO_5 - 2SbS_3$
This is Antimonite of Potash & Tersulfide of Antimony, sol in hot conc sol of KOH, Soda Salt similar

(Basic Salts) - look up

Use large flake graphite like was used in first storage Bat to mixed the P pale stuff —

Ferric hydrox combines with (ortho acid) Arsenous acid Very slightly sol in water

Arsenates + Arsenites of heavy metals may act as P pals if flake graphite used to give conductivity

Schweinfurter Green also Scheele's green are Copper Salts, (Arsenic)

Hypochlorite of heavy metals,

Persulphides of heavy metals

Copper Nitrate (Basic) blue green powder very difficult soluble in water, Composition corresponds to Atacamite. Its remarkable as being one of the few Nitrates difficult soluble eq

$Cu_2(NO_3)(OH)_3$

Make series of Experiments with solution of many salt to get Zinc hydrox soluble etc.

(This is obtained by action of Copper carbonate on Normal Nitrate, or by precipitating (partial) of the later with a Carbonate. The Carbonic acid of which Escapes

Atacamite - $Cu_2Cl(OH)_3$
scarcely sol in Aq
its an oxy-chloride of
Copper -
Sulfure a $CuCl(OH)_3$

The hydrated normal Nitrate
Copper wrapped in tin-foil
foil oxidized vigorously
fires have been caused
by it,

$Na_2H_2Sb_2O_7$ is the insoluble
soda salt, try it in tubes
with grafolo
or soaked in CuO plate

Lots of queer Sb compounds

Salts of Thioantimonic gives
precipitate with heavy
metals insol in Aq

Soak CuO plate in
KPermanganate & heat
to decompose

Oxychloride of Copper probably not sol in NaOH,

Calcium Manganate $CaMnO_3$ also other Manganites, Try all that made $CuMnO_3$ if insol in NaOH try in graphite

Load $\frac{1}{4}$" tube with Black oxide Mn using Nickel flake as rod with Nickel, + try in NaOH with Zinc + also in $CHCl_3$ ammonia like Leclanche — possible reason Leclanche chose MnO_2 Strong Carrier to POST Controls this well Correct that —

Try the Wad Combn of Mn

Zinc hydrox dissolves in NH_4 or K Oxalate -

Discarded Ni Cop record moulds Roast in furnace to oxidize all the Copper to CuO & use ni at Williams works, & all the assaying here

Persulphates of Cu, Fe form basic salts by adding CuOH. or Fe_2O_3 hydrox to make insoluble NaOH or Chlammonia

ditto Nitrates
Bichromates
Arsenates
Arsenites
Antimonates
Borates –

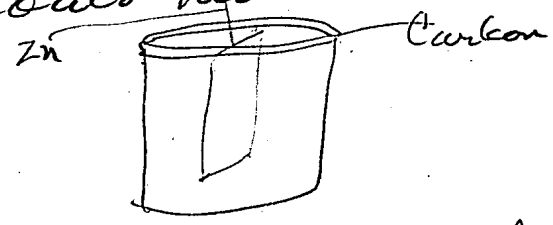
per

Strongly Cop slowly reduces
~~Nitrate~~ Soda to Nitrite Soda
Cold – put Nitrate Na in
NaOH, when Cu is reduced
from CuO this turns &
reduces Nitrate.

In presence of Cerous Salts
Atmospheric Oxy is
absorbed by Arsenious
acid

Mix Copper hydroxide with Kieselguhr
China clay or other powders
in mixing Machine or press plates
in hydraulic — Then ignite to
make CuOH go to CuO +

~~Mand~~ Carbonize some
Cocoanut or peach Kernel
~~[illegible]~~ put in Vac & then
let in Oxygen — then heat
~~for~~ depolarizer —
also in Coated reactive
Could Wound Carbon



Soaking Carbon many times
in Solutions & precipitate the
oxyde in pores

Zn & Copper — NaOH Containing arsenite, or arsenate, Na —

Lead & other Nitrates or Ites for replacing CuO -
As Sb etc | There are double Salts of Nitrites also usual Nitrates being reduced to Nitrites

Basic Phosphates

Storage Battery use Iron Sheets Corrugated 0.05 thick -
Coat by Electrolysis with $Ni(OH)_2$ by surplus of Chloride in the NaOH

then peroxidize by current after transforming to pure NaOH precisely washing - Same with the Salt & Reducing in H, This make a powerful disch rate for Epel uses Starters Cells Etc

Dont forget to try, selectively of ~~Zinc~~, Zn Hydroxide precipitated in Every solution & mixture of solutions & also organic salts in sol

Peroxide lead is only
slightly sol in NaOH

Make a cell with Buffer
partition dividing the
Electrolyte, fill the
Buffer with flow Zinc
to prevent Oxy Compound
reaching the working
Zinc Electrode

This is a good general
Idea

Stable Cupric & the basic Salt

$7CuO-2SO_3-5H_2O$

Prepare by digesting basic Copper sulfate

$7CuO-2SO_3-15H_2O$

with 10% Potassium hydroxide solution — Washing precip with Cold water & alcohol & Dry at 100° Cent Light blueish green color

The basic sulfate itself is obtained by action of 50 CC of 2 N Sodium hydroxide on a sol of 5 grams of Cupric Sulphate in 200 CC of water boiled & dried at 100° Cent.

Dark deposit on Cu hydrox
ignite & press -

Try Sulfonic acid salts.
for desulfuring Zn hydrox -
such as Benzene sulfonate
Soda etc NH4 etc + other
sulfonates - + Basic Sulfonate

Try the Azo compounds for
Oxygen Corrosion

Artificial Sulphide of
Lead made as an anode
put in water (having
small quantity acid)
say H_2SO_4 less than 1%
or a salt. The sulfide by
current is oxidized + then
made Pb peroxide electrical

Change of charge the PbO_2 protects the sulfide from the acid until whole is peroxide -

Barium ferrate not decomp by Cold H_2SO_4 - might use with amalgamated Zinc

When excess of CCl & NaClO Chlorate is added to Ammoniacal sol of Nickel hydrox an ppt of salt is precipitated. They use this to remove Ni from commercial $AsCl_3$ containing Fe Zn Co etc which are not affected -

When solutions containing
Ammonia-Cupric hydrate
or Hydrochlorate with
Solution of Iron Chloride
Peroxide of Copper
deposited on Anode

Ignited Antimonate of
Potash not sol in alkali
ditto Antimonate of Cobalt
ditto Antimonate of Copper
$CuO, Sb_2O_5 \times aq$

gummy Antimonate of
Potash - precipd by
Chl Ammonium sol -
(Lechemoke)

"Insol Antimonate Potash"
sol in boiling aq Caustic
Potash, precipitd again on
cooling. The traces are
precipitd by a sol Potash
salt,